

Psychological Functioning of Adolescent and Young Adult Survivors of Pediatric Malignancy

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Objective. To assess the psychological functioning of adolescent and young adult survivors of pediatric malignancy, and identify risk factors for maladjustment.

Design. Patients age ≥ 14.5 years ($N = 161$) receiving surveillance follow-up at a major pediatric cancer center completed the SCL-90-R, a self-report measure of psychological symptomatology. Comparisons were made with the normative standardization sample, and the relationship of selected demographic and medical variables with psychological distress was explored using logistic regression analyses.

Results. Survivors mean scores on all SCL-90-R subscales were lower than those of the standardization sample, and the distribution of scores on the Anxiety, Psychoticism, Global severity Index, and Positive Symptom Total scales were significantly below normative values. No SCL-90-R subscale displayed an excessive frequency of clinically elevated scores. For pa-

tients who displayed clinical elevations on the SCL-90-R, three factors were identified which were associated with increased risk of maladjustment: older patient age at follow-up, more frequent disease relapse, and more severe functional impairment.

Conclusions. This cohort of childhood cancer survivors is characterized by very low levels of psychological distress and significantly better psychological health than would be expected according to normative data. These findings contrast with those of another study from the same institution in which a fourfold increase in social and behavioral problems was found amongst younger survivors, in the age range 7–15. The use of self-report vs. parent-report, and the potential influence of repressive adaptation on the self-reports of pediatric cancer survivors, are raised as possible explanations for these findings. *Med. Pediatr. Oncol.* 29: 582–588, 1997. © 1997 Wiley-Liss, Inc.

Key words: pediatric oncology; survival; adjustment; psychological symptoms; repression

INTRODUCTION

Dramatic improvements in childhood cancer cure rates over the last 30 years have resulted in a rapidly growing population of survivors. With current overall cure rates exceeding 60%, it is anticipated that by the year 2000, 1 in 1000 young adults will be the survivor of a pediatric malignancy [1,2]. This population encounters increased risks for a variety of medical late effects, including specific organ toxicities, delayed growth, and other endocrinological problems, reduced fertility, neurocognitive impairments, and second malignancies [3–8]. One might expect that survivors of childhood cancer would also experience a higher frequency of disturbance in psychosocial adjustment, given their frequency of chronic medical complications, their at-risk status, and the psychological trauma of their earlier illness experiences [9–11]. However, the research to date on psychosocial outcomes of survivors has been characterized by equivocal and, at times contradictory findings [12].

A number of studies have documented an increased incidence of psychological problems in childhood cancer survivors, with rates of maladjustment as high as 50% [13–17]. In the first major research effort in this area, Koocher and O'Malley [13] utilized both patient and

parent self-reports as well as interview data from a cohort of 117 long-term survivors. They reported that, although most long-term survivors of pediatric malignancy were able to lead relatively normal lives in terms of academic, vocational, and social functioning, nearly half showed evidence of significant psychological problems. Similarly, a study limited to adolescent and young adult survivors of childhood Hodgkin disease, utilizing interview data and study staff ratings, documented evidence of maladjustment in nearly a third of their sample [15]. Using parent and teacher questionnaires, Moore et al [16] reported a higher incidence of school and behavior problems in adolescent survivors of acute lymphocytic leukemia. In an earlier report from our institution, a large cohort ($N = 183$) of survivors in the age range 7–15 years were evaluated using a standardized parent-report

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measure of social competence and behavior problems [17]. A two to four-fold increase in both social competence deficits and behavioral problems was seen in the survivors relative to normative data for the general population. Evidence of significant problems in one or more domains of behavioral adjustment was found in 42% of this sample of survivors.

In contrast to the above reports, a nearly equal number of studies have indicated a picture of normal adjustment, with a relative absence of psychopathology and few differences between cancer survivors and controls [18–22]. These disparate findings may be attributable to methodological differences, including differences in specific outcome variables, in the types of measures used, in respondent (patient, parent, or teacher), in sampling and sample size, and in the timing of assessments. However, careful examination of study methods in relation to outcome reveals no clear pattern that can sufficiently explain these disparities.

Those attempting to summarize these contradictory findings have presented a “middle of the road” interpretation, suggesting that while severe psychopathology is relatively rare, mild to moderate adjustment difficulties are seen in a significant percentage of survivors [12]. Unfortunately, this at-risk subset of survivors has not been clearly identified, and there have been contradictory findings regarding the relationship of psychological outcomes with variables such as gender, diagnosis, age at diagnosis, and time-elapsed since diagnosis or other medical variables. For example, some studies have found that psychological difficulties were related to the presence of more severe late medical effects or physical impairment [17,20], while other have found no relationship between these variables and psychological adjustment [14,18].

The present study describes the psychological functioning of a large cohort (161) of long-term survivors of childhood cancer. In contrast to an earlier study from our institution which focused on child and young adolescent survivors and thus utilized parent-report as a primary outcome measure, the present report describes psychological outcome in older adolescent and young adult survivors utilizing patient self-report.

METHODS

Subjects

Patients attending the After Completing Therapy (ACT) Clinic at St. Jude Children’s Research Hospital and meeting the eligibility criteria, were recruited for participation in this study. The ACT clinic provides annual monitoring of patients who are considered long-term pediatric cancer survivors. To be eligible for the clinic, patients must be disease-free, at least 5 years from their date of diagnosis, and at least 2 years post-

TABLE 1. Demographic and Medical Characteristics of Patient Sample (N = 161)^a

Variable	Median	Range
Age at diagnosis	10.1	0.2–20.9
Time since diagnosis	9.5	5.1–16.5
Time from completion of therapy	7.2	2.4–14.8
Age at evaluation	19.0	14.5–30.9
Socioeconomic level	4	1–5
	Frequency	Percent
Female gender	76	47.2
Diagnosis		
Acute lymphoblastic leukemia	59	36.6
Other leukemia	6	3.7
Hogdkin disease	25	15.5
Non-Hogdkin lymphoma	26	16.1
Sarcomas	25	15.5
Other solid tumor	20	12.4
Treatment		
Chemotherapy	150	93
Surgery	71	44
Amputation	11	7
Radiation therapy	126	78
Cranial	68	42
Relapse	21	13

^aAge and time values are in years.

completion of all therapy. Routinely, patients are followed until they are 10 years post-completion of therapy or until they are 18 years of age, whichever comes second. For the present study, we limited the sample to consecutively enrolled patients over a 12-month period who have had a primary diagnosis of cancer and were ≥ 14.5 years old at the time of their clinic visit. Patients who were both more than 10 years off therapy and older than 18 years were excluded, because only patients with extraordinary problems would continue to be followed under those circumstances. Of the 173 patients who met these criteria, 12 were excluded because of irregularities in administering or completing the Symptom Checklist-90-Revised. Thus, 161 patients were considered fully evaluable.

Demographic and medical characteristics of the sample are presented in Table 1. The median age was 10.1 years at diagnosis and 19 years at follow-up. Patients had received an average of 2.3 years of treatment; 93% with chemotherapy, 44% with surgery, and 78% with radiation therapy. Approximately 13% had experienced disease recurrence or relapse. Males and females were equally represented. The sample was skewed toward the lower range of socioeconomic rankings (as determined by the Hollingshead two factor index [23]), consistent with hospital referral patterns. The distribution of oncologic diagnoses revealed that almost 70% of the patients were treated for leukemia, lymphoma, or Hogd-kin disease. Of those patients ≥ 18 , more than 80% were employed full-time or were in school. Patients who had never been married (65.3%) constituted the majority of

the sample with 31.6% currently married and 3.1% divorced.

Symptom Checklist-90-Revised

The Symptom Checklist-90-Revised (SCL-90-R) is a 90-item, self-report symptom inventory designed to reflect the psychological symptom patterns of psychiatric and medical patients [24]. Each item is rated on a 5-point scale of distress (0–4), ranging from “not at all” to “extremely” in terms of “how much discomfort that problem has caused you during the past week including today.” The SCL-90-R is scored and interpreted in terms of 9 primary symptom dimensions (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism) and three global indices of distress (Global Severity Index, Positive Symptom Distress Index, Positive Symptom Total). The Global Severity Index represents the best single score of psychological distress. Internal consistency and test-retest reliability coefficients are acceptable for the nine symptom dimensions, and factor analytic studies have generally confirmed the intended structure of the inventory [24]. The SCL-90-R has previously been applied to a number of medical populations including adult cancer patients [25].

Procedures

In addition to routine laboratory procedures, physical examinations, and medical histories, patients completed the SCL-90-R. None of the patients refused to complete the checklist. The medical records of all patients were thoroughly reviewed to identify major medical events such as diagnoses and therapies received. The socioeconomic levels of the families were calculated according to the Hollingshead Index [23], the same system used in the standardization of the SCL-90-R. Cosmetic and functional impairments were rated separately as normal, mild, moderate, or severe, with modifications of criteria used in previous studies of long-term survivors of childhood cancer [15]. Inter-rater reliabilities have ranged from 87–95% in a previously study of younger children surviving cancer [17].

Statistical Methods

Raw scores for the nine symptom dimensions and three global distress indices were converted to age- and gender-corrected standard scores (T-scores) with a mean of 50 and standard deviation of 10 based upon general population norms ($n = 1780$) [23]. Differences between mean T-scores of the current survivor sample and the standardization sample were tested using a one sample t-test. A T-score value of 65 was used as the cutoff for identification of patient maladjustment. Logistic regression analyses were used to generate odds ratios as measures of relative risk of abnormality on SCL-90-R sub-

scales given the presence of selected demographic medical variables. Demographic variables entered as predictors included the patient's age at diagnosis, gender, and socioeconomic level. Medical variables included time since diagnosis; diagnostic group (leukemias vs. solid tumors); duration of therapy; time since completion of therapy; age at follow-up; treatment with surgery, chemotherapy, and irradiation; disease relapse (0, 1, 2, or more); and cosmetic and functional ratings. Two-tailed tests of statistical significance ($\alpha = .05$) were computed and 95% confidence intervals were calculated with significance resulted.

RESULTS

Cosmetic and Functional Impairment

The majority of the patients (75.2%) exhibited some cosmetic residual of their disease and treatment, although only 8.1% were rated as severely impaired (Table II). Most patients (64%) were rated as having no significant functional impairment. As with cosmetic sequelae, very few patients (2.5%) manifested severe functional impairment at follow-up.

Psychological Functioning

The SCL-90-R results for the 161 participating patients indicate that no scale showed a statistically significant elevation relative to the test norms for the general population (Table III). In fact, mean scores on *all* subscales were lower than those of the standardization sample, and distributions of scores on the Anxiety, Psychoticism, Global severity Index, and Positive Symptom Total scales were significantly below normative values. Compared to the expected 7% incidence of clinical elevations (defined as $T \geq 65$) in the general population, no scale displayed an excessive frequency of elevations (Table III). Overall, this population of survivors of childhood cancer appears significantly healthier than age- and gender-matched norms for the general population. All SCL-90-R subscales were significantly correlated with both patient age at diagnosis and age at testing. Correlations were modest, ranging from .20–.40. For the Global Severity Index, the correlation with age at diagnosis was $r_s = .28, p < .001$; and with age at testing, $r_s = .33, p < .0001$. No other demographic or medical variables demonstrated statistically significant simple correlations with the SCL-90 subscales.

For the small percentage of patients who did display one or more clinical elevations on the SCL-90-R ($T \geq 65$), only three factors were identified which were associated with increased risk of maladjustment: older patient age at follow-up, greater number of relapses, and presence of severe functional impairment (Table IV). Increasing patient age was associated with elevations on the Somatization, Anxiety, Hostility, Phobic Anxiety,

TABLE II. Composite Cosmetic and Functional Impairment Ratings

Variable	No. (%) of total	Criteria
Cosmetic impairment		
None	40 (24.8)	Inapparent physical residual except that biopsy scar may be present
Mild impairment	43 (27.3)	Physical residual obvious only during physical examination or when subject is wearing a bathing suit, facial disfigurement can be covered by cosmetics
Moderate impairment	64 (39.8)	Physical residual obvious when subject wears street clothes, facial disfigurement remains obvious even with use of cosmetics
Severe impairment	13 (8.1)	Physical residual constitute obvious deformity
Functional impairment		
None	103 (64.0)	No interference with normal activities for age
Mild impairment	34 (21.1)	Problems necessitate daily attention but cause little disruption of normal activities
Moderate impairment	20 (12.4)	Subject requires help with activities of daily living normally performed independently
Severe impairment	4 (2.5)	Subject requires frequent help and assistance with activities of daily living

TABLE III. Standard Score Distribution for SCL-90-R

SCL-90-R scale	Mean	SD	t ^a	p ^b	Clinical range (%) ^c
Somatization	49.0	9.6	-1.25	.211	5.0
Obsessive-Compulsive	48.5	10.6	-1.81	.073	6.8
Interpersonal sensitivity	49.5	11.0	-0.58	.565	9.3
Depression	49.0	10.1	-1.22	.223	5.6
Anxiety	47.7	9.8	-2.98	.003	5.6
Hostility	49.2	10.0	-0.96	.339	9.3
Phobic anxiety	49.8	9.0	-0.24	.813	8.7
Paranoid ideation	48.6	10.5	-1.67	.096	8.1
Psychoticism	47.6	10.6	-2.91	.004	6.2
Global severity index	47.9	11.1	-2.37	.019	5.6
Positive symptom distress index	49.3	9.4	-0.90	.371	4.3
Positive symptom total	45.8	12.7	-4.14	<.001	5.6

^aT-scores based upon test norms ($M = 50$; $SD = 10$).^bDeparture from normative distribution; two-tailed t-tests.^cPercent of patients with $T \geq 65$.

and Psychoticism scales as well as an elevated Global Severity Index and Positive Symptom Total. Increased risk for elevations ranged from 2.1–4.8 for every 5 year age increment beyond age 20. A single relapse more than doubled the likelihood of both Obsessive-Compulsive and Paranoid Ideation elevations. For both scales, risk for pathology was increased with two or more, as opposed to one incident of disease recurrence. Finally, severe functional impairment of the patient was associated with an 11-fold increase in the risk of elevations on the Interpersonal Sensitivity scale. Factors which were not associated with increased risk of elevations on any SCL-90-R scale included patient age at diagnosis, gender, socioeconomic status, diagnosis, methods of medical treatment, and cosmetic status at follow-up.

DISCUSSION

The cohort of adolescent and young adult survivors of childhood cancer surveyed in this study is characterized by an absence of psychopathology and generally low levels of psychological distress, based on their SCL-90 scores. In fact, this group of survivors appears significantly healthier than would be expected according to normative data. These findings add to the group of studies that have emphasized generally normal adjustment among childhood cancer survivors [18–22], and contrast with those studies that have reported higher levels of psychological problems in this population [13–17]. These findings also contrast with those of an earlier study conducted at this institution, in which a four-fold increase in social and behavioral problems was found amongst survivors in the age range 7–15 years [17].

The contrasting findings from different age cohorts evaluated at the same institution would logically point to developmental issues as an explanatory factor. Curiously however, in both the present study, and the earlier report from our institution [17], significant positive correlations between age and psychologic symptoms were observed. Thus, based on this finding, one would anticipate a higher incidence of psychological difficulties in the present, older cohort, in comparison to the younger cohort, the opposite of what was observed. Clearly, other methodological factors must be invoked in attempt to explain these discrepancies. Aside from the age of the patients, the most notable methodological difference between these two studies relates to the respondent: the psychosocial functioning of the younger survivors was measured by parent-report, and the current study utilized patient self-report.

TABLE IV. Odds Ratios and 95% Confidence Intervals for Elevations T > 65 on SCL-90R Scales

SCL-90-R Scale	Covariate			
	Patient age at follow-up ^a	Number of Relapses		Severe functional impairment ^d
		1	2	
Somatization	3.5** (1.4–8.7) ^b	—	—	—
Obsessive-Compulsive	—	2.5* (1.2–5.2)	6.2* (1.5–26.6)	—
Interpersonal sensitivity	—	—	—	11.1* (1.4–85.2)
Depression	—	—	—	—
Anxiety	2.6* (1.1–5.9)	—	—	—
Hostility	2.1* (1.1–4.1)	—	—	—
Phobic anxiety	2.6* (1.3–5.1)	—	—	—
Paranoid ideation	—	2.2* (1.1–4.5)	4.8* (1.2–20.0)	—
Psychoticism	3.7** (1.5–9.2)	—	—	—
Global severity index	2.7* (1.2–6.1)	—	—	—
Positive symptom distress index	—	—	—	—
Positive symptom total	4.8*** (1.9–9.1)	—	—	—

^aIndexed at the median (20 years) for the sample. Odds ratios refer to increases above the median in 5 year intervals.

^bIf no cosmetic impairment.

^cNo relapse is index category.

^dRelative to moderate or less impairment.

* $p < .05$; ** $p < .01$; *** $p < .001$.

The available research regarding psychosocial outcome for childhood cancer survivors does not indicate why psychosocial outcomes should differ as a function of parent- vs. child-report. However, there is a tendency for those studies relying primarily on self-report to show a more benign outcome [18–20], while those utilizing parent, teacher, or staff reports appear to show higher levels of maladjustment [13–17]. There is a large body of literature relating to the correspondence of parent and child ratings of affective distress and behavioral problems [26–30]. In general, parent-child agreement is low, and, where direct comparisons can be made, there is a tendency for children to under-report symptoms relative to the reports made by their parents [27,29]. There are no data to indicate that one informant is consistently more accurate than the other. However, there is some evidence to suggest that parental depression promotes their over-reporting of depressive symptoms in their child [29]. This is a significant consideration given the high level of stress experienced by parents of children with cancer, and evidence of post-traumatic stress disorder and other affective symptomatology in parents of long-term survivors [11,31].

On the other hand, there is also evidence to suggest that it is the patients' reports which are biased towards minimization of affective distress, and a propensity to present themselves in a more favorable light [32–35]. Recent studies have demonstrated a high incidence of a repressive adaptive style in children with cancer (both on and off therapy), which accounts for their lower scores on self-report measures of affective distress [34,35].

Children identified as 'repressors' have been shown to score lower on measures of anxiety, depression, and anger expression [34–36]. The available evidence also suggests that repressive adaptation is a stable personality trait that might be expected to endure after completion of cancer therapy [36]. The present finding that childhood cancer survivors' scores on the SCL-90R were significantly lower than published norms supports the hypothesis that repressive defenses may decrease the self-report of negative psychological outcomes for this population. The repressor hypothesis may therefore help to explain some of the discrepant findings from previous studies of childhood cancer survivors.

Despite the low percentage of patients exhibiting clinically significant elevations on SCL-90R subscales, 3 risk factors were reliably identified as predictors of maladjustment. The association for the number of relapses and greater functional impairment with increased psychological distress makes sense intuitively, and replicates findings from previous research [13,17,20]. The consistent association of patient age at follow-up with increased risk of psychological distress is more difficult to interpret. It may be that an older cohort of patients was exposed to more intensive therapy, particularly radiation therapy, and the known late effects on neurocognitive functioning are greater in this group, leading also to an increase in psychological distress. The repressive adaptive style hypothesis also provides another possible explanation. The effects of defensiveness and social desirability on self-report are known to decline with age in children [35,37], which would foster an increase in report

of problems with increasing age. Thus, it may be that when patients become adults they are less defended in their self-presentation and respond in a more direct and honest manner, whereas the adolescents may still be responding primarily to social cues and pressure to present themselves in the most favorable light.

The present study has some methodological shortcomings that limit our interpretation, but also point towards future research. First, the present results were obtained from a single institution and thus it is unclear how generalizable they may be, particularly given discrepant findings from other single site studies that have been reported in the literature. Certainly, collaborative group and other multi-institutional studies would help to clarify this issue. The present design did not include data from parents or others capable of reporting on the patients' psychological functioning. This was primarily due to the fact that in our setting, many older patients return for their annual visits unaccompanied by a parent. However, in future research, efforts should be made to include the reports of the significant others (parents, spouse) of adult patients. Discrepancies between patient and others' reports may indicate the influence of a repressive response style, which could also be assessed directly through self-report measures of defensiveness and subjective distress [38], or through discrepancies between self-report and physiological measures of anxiety [38,39]. The absence of severe psychopathology in long-term survivors of childhood cancer is encouraging, but before we become complacent about the psychological functioning of this population we must ensure that the positive outcome revealed here is not partly reflective of "illusory mental health" resulting from psychological defenses [39].

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